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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference 6515.P023PCT | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US03/18004 | International filing date (day/month/year) 06 June 2003 (06.06.2003) | Priority date (day/month/year) 07 June 2002 (07.06.2002) |
| International Patent Classification (IPC) or national classification and IPC IPC(7): H04B 1/10, 1/38 and US Cl.: 375/219,222,346 | | |
| Applicant TOKYO ELECTRON LIMITED | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

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| Date of submission of the demand 22 December 2003 (22.12.2003) | Date of completion of this report 05 May 2004 (05.05.2004) |
| Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230 | Authorized officer Young Tse Telephone No. 703-305-4736 |

Form PCT/IPEA/409 (cover sheet)(July 1998)

I. Basis of the report**1. With regard to the elements of the international application:***

- ☒ the international application as originally filed.
- ☒ the description:
pages 1-25 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the claims:
pages 26-34, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the drawings:
pages 1-6, 8, 9, 11 and 12, as originally filed
pages NONE, filed with the demand
pages 7, 10 and 13, filed with the letter of Article 34 Amendment.
- ☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. STATEMENT**

| | | |
|-------------------------------|--|-----|
| Novelty (N) | Claims <u>8-12, 20-24, 32-36 and 43-47</u> | YES |
| | Claims <u>1-7, 13-19, 25-31 and 37-42</u> | NO |
| Inventive Step (IS) | Claims <u>8-12, 20-24, 32-36 and 43-47</u> | YES |
| | Claims <u>1-7, 13-19, 25-31 and 37-42</u> | NO |
| Industrial Applicability (IA) | Claims <u>1-47</u> | YES |
| | Claims <u>NONE</u> | NO |

2. CITATIONS AND EXPLANATIONS

Claims 1-7, 13-19, 25-31 and 37-42 lack novelty under PCT Article 33(2) as being anticipated by Polley et al. Regarding claims 1, 13, 25 and 37, Polley teaches a method, a system, a computer readable medium comprising creating a communications line with two or more twisted copper pairs of wire in one or more binders (see Fig. 6b), coordinating physical-layer signals across two or more receivers and transmitters (see Fig. 1e).

Regarding claims 2, 14, 26 and 38, Polley further teaches comprising minimizing interference noise on the communications line from external sources. (note col. 41, lines 45-59)

Regarding claims 3, 15, 27 and 39, Polley also teaches interference noise includes crosstalk noise from high-bitrate services in the one or more binders. (see Fig. 14d and note col. 41, lines 45-59)

Regarding claims 4, 16, 28 and 40, Polley teaches exploiting a correlation between measured interference noise values across the two or more receivers. (note col. 23, lines 8-27)

Regarding claims 5, 17, 29 and 41, Polley teaches two or more receivers and two or more transmitters utilize a DMT architecture having one or more frequency bins. (note col. 2, line 60 - col. 3, line 13)

Regarding claims 6, 7, 18, 19, 30, 31 and 42, Polley teaches wherein coordinating physical-layer signals across two or more receivers and transmitters is performed in a frequency domain, independently for each frequency bin of the one or more frequency bins. (note col. 9, lines 16-62)

Claims 8-12, 20-24, 32-36 and 43-47 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest combination of multiplying transmitted symbol vector with a MIMO (Multiple Input Multiple Output) pre-processing matrix, IFFT, FFT and multiplying MIMO post-processing matrix with the frequency domain symbols.

Claims 1-47 meet the criteria set out in PCT Article 33(4), and thus claims 1-47 meet industrial applicability because the subject matter claimed can be made or used in industry.

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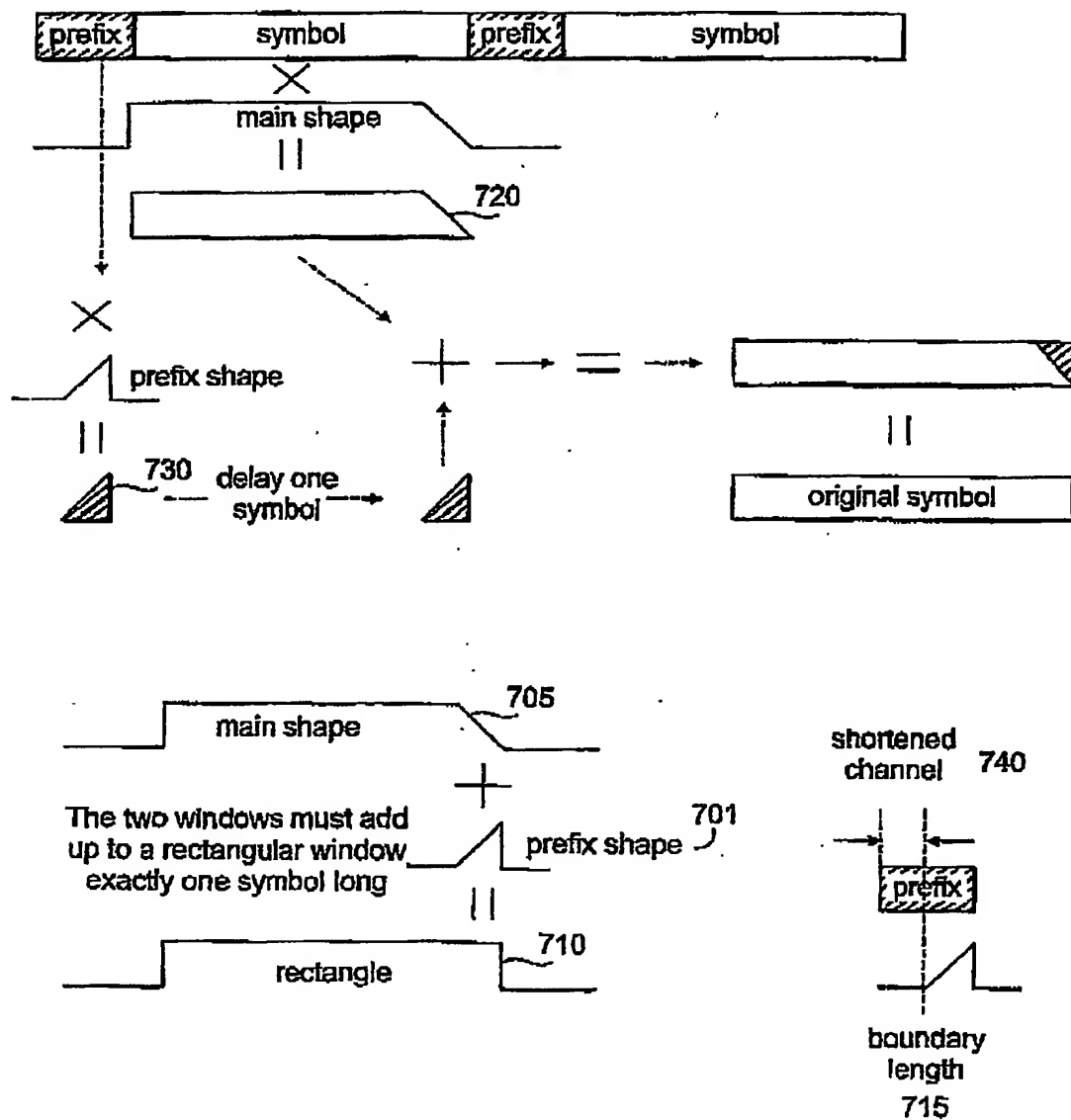


FIG. 7

AMENDED SHEET

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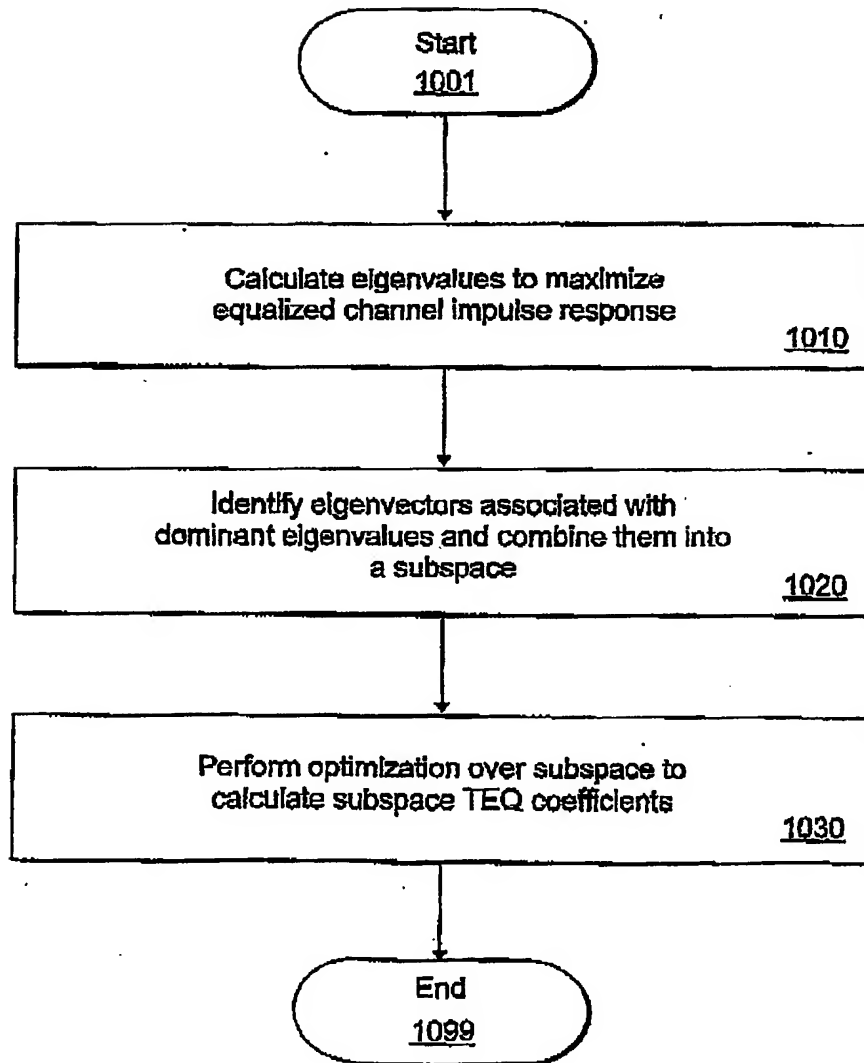


FIG. 10

AMENDED SHEET

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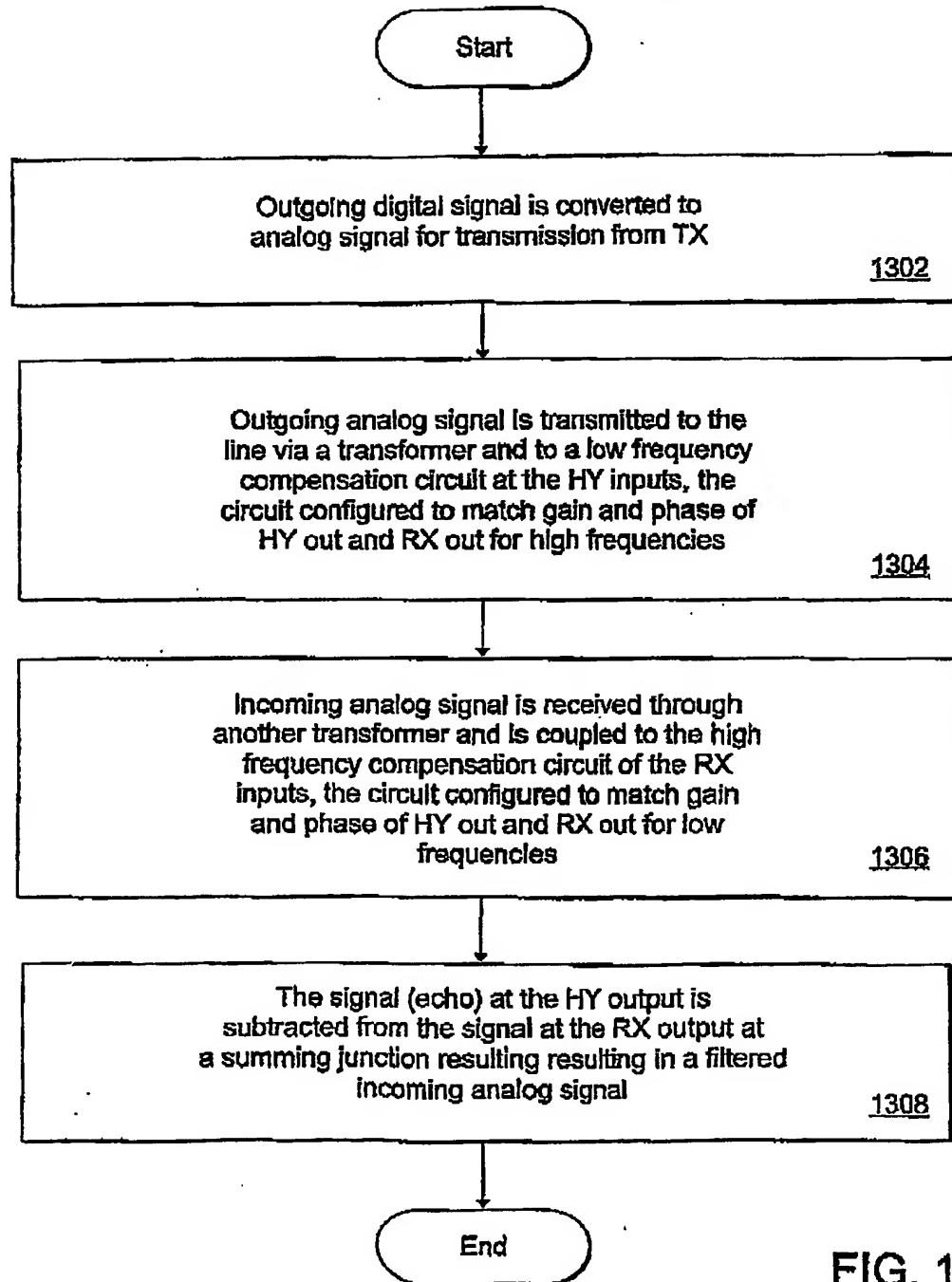


FIG. 13